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Imports and Growth in Africa

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Faster economic growth in Africa involves a recovery in the growth of imports — and greater efficiency in their use.

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Broad comparisons show that growth is linked to imports, but country comparisons over short periods show the link to be more flexible than fixed. Countries can adjust import intensities in the short term — maintaining growth, even with depressed imports.

For Africa, in these stringent times, a big question has been whether better domestic policies induce structural changes that also spur more growth for each dollar of imports. Put differently, Can African countries reduce their historically high import dependence? Can they resume growth without substantially increasing their imports?

One set of policies affecting the import efficiency of growth includes those that improve the incentives for agriculture and for restructuring the manufacturing sector. Another set includes macroeconomic changes that affect the real exchange rate and the level and composition of public spending. Such policy changes have been under way to varying degrees in several African countries — among them, Ghana, Kenya, Zaire, Zambia, Nigeria, Tanzania, Madagascar, and Côte d'Ivoire.

What, then, are some of the policy outcomes that change the import intensity of growth?

Some shifts reduce import dependence. One is a shift from public consumption to private consumption. Another is a depreciation of the real exchange rate. And a third is a shift to agricultural growth.

By contrast, opening the trade regime and promoting exports would encourage imports (and exports). Restructuring industry to increase its productivity would also increase some imports (but reduce others).

What emerges from this analysis is that some policy changes and structural adjustments in Africa can change traditional import intensities. But if African countries are to achieve faster sustained growth, imports will need to increase substantially from the recently depressed levels. And countries will have to use those imports far more efficiently than in the past.

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IMPORT-GROWTH RELATIONSHIP AND POLICY: SOME CONSIDERATIONS FOR AFRICA

I. OVERVIEW

1. Assumptions about import growth provide an essential link between GDP and the balance of payments in medium-term country frameworks. Even the simplest accounting frameworks, such as the Bank's RMSM, rely on estimates of import elasticities to reconcile GDP and balance of payments forecasts. RMSM, for instance, utilizes past GDP-import relationships to project imports that would be consistent with growth targets, and adjusts the import levels given external financing. Country analyses of the import elasticities, however, are still limited. Especially needed is a better understanding of the determinants of the GDP-import relation and how it is affected by domestic policy. Motivated by this gap, this paper responds to the Africa Region's request for a review of the import-GDP relationship in the context of Africa's financing constraints. It focuses on Africa and on selected countries involving significant policy changes: Côte d'Ivoire, Ghana, Kenya, Madagascar, Nigeria, Tanzania, Zaire and Zambia in the quantitative analysis, as well as Ethiopia and Zimbabwe in some of the discussion. While the paper concerns Africa primarily, it also examines broader issues regarding import projections.

2. Behavioral models explaining imports use income and price elasticities of import demand to capture the effects of income and relative price changes. Previous econometric estimates of these ex ante, partial elasticities are reviewed in the next section of the paper. Econometric analysis for a twenty year period reveals strong and significant relationships between income and imports, with income elasticities well above one for

Africa. Accounting frameworks, on the other hand, rely on estimates of the aggregate import-GDP relation. Such ex post, "composite" elasticities relating imports to income differ from the partial income elasticities not only because the former include price effects but also because they take into account other factors such as foreign exchange constraints and quantitative restrictions. For Sub-Saharan Africa, the availability of external assistance and foreign exchange have been especially binding in limiting import growth in recent years. Accordingly, the composite elasticity tends to exhibit more short-term instability than the income elasticity. Short-term reductions in the composite elasticity, however, are found to be followed by a catching up such that there is significantly more stability in its long term relationship. Consequently, the long-term import-GDP ratio appears fairly stable.

3. Africa's prospects for exports and the supply of foreign savings in the 1980s have implied considerable tightness in import financing. A part of this resource constraint has been reflected in depreciations of the real exchang rate, but another part has meant a continuation of foreign exchange controls, quantitative restrictions and import tariffs. Concomitantly, imports are determined not only by income changes but also by relative prices changes and restrictions. The Special Office for African Affairs has previously forecasted that import volume growth in the coming years in Sub-Saharan Africa might be constrained to about 3 percent annually. Overall GDP has been projected to grow by about 4 percent annually. The implied composite elasticity of less than one was below past long term estimates for Africa. Individual country forecasts by country economists vary -- but, on the whole, the long term projected elasticities have been well below past long-term estimates. The implicit income elasticities in recent country projections seem to be well below one on the whole for the next ten years or so. If the

foreign exchange constraint remains tight, attention focuses upon both the compressibility of imports and the import requirements for adjustment and growth -- especially intermediate inputs and raw materials. Concern for the import-GDP relation is equally valid in the event of a more relaxed foreign exchange outlook. Attention in such a scenario is also directed towards the efficient use of imports.

4. This paper discusses factors that are relevant to making judgements about future elasticities, and, more broadly, to assessing the extent to which the past can be used as a yardstick for the future. The composite elasticities summarize actual past behavior, considering binding constraints (such as QRs) and flexibility in importation. The experience of the past twenty years contains evidence both on import-GDP relation both under favorable external conditions (1970s) as well as otherwise (1980s). The flexibility in the import-GDP ratio seems significant, at least in the short term, especially when previously high import financing meant considerable "fat" in imports. Where policy changes are feasible, this flexibility appears more significant. In such situations, however, the question deserves to be raised whether the elasticity can continue to be low or even lowered further in view of the import compression and sustained income decline that have already taken place during the 1980s. It also relates to the import requirements of adjustment, industrial restructuring and growth. The import implications of reorientation also work in the upward direction, i.e. when import financing is relatively relaxed. Evidence on import dependency and inefficiency has implications for the need for redirection independently of the financing outlook, and it therefore affects the composition of imports supported.

5. The key questions in this connection seem to be:

- What are the long- and short-term import elasticities in the African experience?
- Are envisaged output growth rates consistent with the imports outlook; to what extent should the past be used as a guide to future possibilities?
- To what extent is import demand a result of fixed coefficients? How and to what extent is the flexibility in the import-GDP relation (and exports) affected by structural and policy adjustment? How much can they be lowered on a sustained basis?
- What are the aspects of quality and composition of imports that should support adjustments even if the elasticities do not need to be lowered in view of better export responses and financing?

6. It should be noted at the outset that this paper does not give conclusive answers to these questions. First, the present discussion should be qualified by reference to data limitations: for instance, smuggling and mis-statements of imports limit the adequacy of the published data used in the paper. It has been hard to assess whether the bias in report is systematic, although some relationships (to exchange rate changes, transport, port and administrative improvements, etc.) can be surmised. Second, non-price and institutional dimensions, which are so important to Africa, are beyond the scope of this paper. Quality of the infrastructure seems to be a particularly important determinant of the import-GDP relation. Other potentially important variables, not yet analyzed, are urbanization, the quality and composition of aid financing, and export prospects. And finally, although this paper brings global estimates of import elasticities to the Regional and to a selected

country-group level, it still remains aggregative. For individual countries, therefore, reference to the estimates in this paper could provide no more than a cross-check to country-specific judgements. Keeping this caveat in mind, however, some generalizations and possible ways of classifying countries in terms of effects of policies on import elasticities are provided.

7. Section II provides estimates of partial and composite elasticities, suggesting expected ranges for their values in country work. Going behind the numbers, analyses of how policies affect the estimates are suggested. Thus the rest of the paper is devoted to selected structural and policy considerations of relevance in adjustment in Africa. One set of factors influencing the import intensity of growth is the structural composition of output, which is examined in Section III. The sectoral output composition is affected by economic growth as well as by policy shifts, such as the efforts to improve agricultural incentives and to restructure industry in Sub-Saharan Africa. On the one hand, the steady decrease in agricultural share in GDP with growth raises the import intensity, whereas reductions of past distortions against agriculture (and any increases in import-saving activities in general) have the opposite effect. Effects in industry can also be ambiguous. Country evidence points to inefficiency associated with past import dependency and protection in manufacturing, which would suggest compressibility of imports under restructuring. On the other hand, rehabilitation and renewal of capital can be import-intensive in specific cases. Without suggesting any special effort to shift the sectoral composition or carry out adjustments on grounds of import-intensity per se, the paper evaluates orders of magnitude of possible import changes from ongoing and proposed policy changes.

8. Macroeconomic policy changes affect imports (and exports). Again, without recommending any particular emphasis in policy for import reasons, Section IV examines possible effects of macroeconomic adjustments underway in Africa. Import demand is dependent on aggregate expenditures which have come under pressure during stabilization. The extent to which expenditures -- and therefore import growth -- can be reduced while protecting income growth would determine whether the import intensity of growth (i.e. the import-GDP ratio) can be lowered compared to long-term trends. The levels and kinds of public spending can change import intensity, and better public management and increased capacity utilization can improve import efficiency. Exchange rate depreciation reduces import demand, while import reforms -- in the absence of such depreciation -- can have the opposite effect, so that the net outcome depends on the relative sizes of these effects. Export promotion may lead to increased imports, particularly as non-traditional exports are import-intensive. Furthermore, what happens to the import-GDP ratio in response to real exchange rate and other policies depends not only on their effects on imports, but also on output. The final part of Section IV is devoted to the analysis of the import-GDP ratio rather than imports. Analysis of the import-GDP ratio gets around the difficult question whether GDP determines imports or whether imports determine GDP in the face of foreign exchange constraints. Finally, to the extent that domestic reforms, or autonomous and ongoing changes, encourage labor-intensive production, they could lower import-GDP ratios.

9. The paper provides preliminary estimates of the orders of magnitude of some of these effects: additional empirical and country-specific work is needed to make the results more operational. It is readily seen that the extent of applicability of each type of policy change in affecting imports

depends on where one starts and the degree of change implemented. The needed redirection and the commitment to reform obviously vary from case to case. Country studies are full of information on policy weaknesses and needed changes. In a summary study based on 1970s' data, Agarwala [1983] found the degree of distortions (and hence needed redirection) particularly high in Tanzania, Nigeria and Ghana and moderate in Côte d'Ivoire and Kenya. Similar results are given in this paper based on econometric estimations. Combined with country knowledge of how much change is feasible, judgments on adjustment possibilities and effects on imports should be made in policy analysis.

II. MEASURES OF THE IMPORT-GDP RELATIONSHIP

Partial vs. Composite Elasticities

10. World-wide estimates point to the possibility that income elasticities of import demand over a long period of time would be substantially more than one. In a recent study by Pritchett (1986) for 28 developing countries, income elasticities are significant and substantially greater than one. The mean of the 28 country sample of income elasticities was 1.33. Only two countries have income elasticities significantly less than one whereas 12 of the 28 (43 percent) have income elasticities significantly greater than one. Such results seem to also hold on average for a sample of 15 African countries examined. Results for the eight African countries are given in Table 9: the average value of the income elasticity is over 1. Moran (1987) obtained OLS estimates of long-term income elasticity for developing countries ranging from 0.7 to 1.5. These estimates, it is shown, do not take into account foreign exchange constraints which have the effect of reducing the responsiveness of imports. Disaggregated import elasticities

were calculated by Agbonyitor (1986) for Tanzania, Zaire, Somalia, Côte d'Ivoire, and Sudan: the elasticity for petroleum imports ranged from 1.4 to 2.9, for investment imports from 1 to 2.5 and for intermediate imports from 0.8 to 2.1.

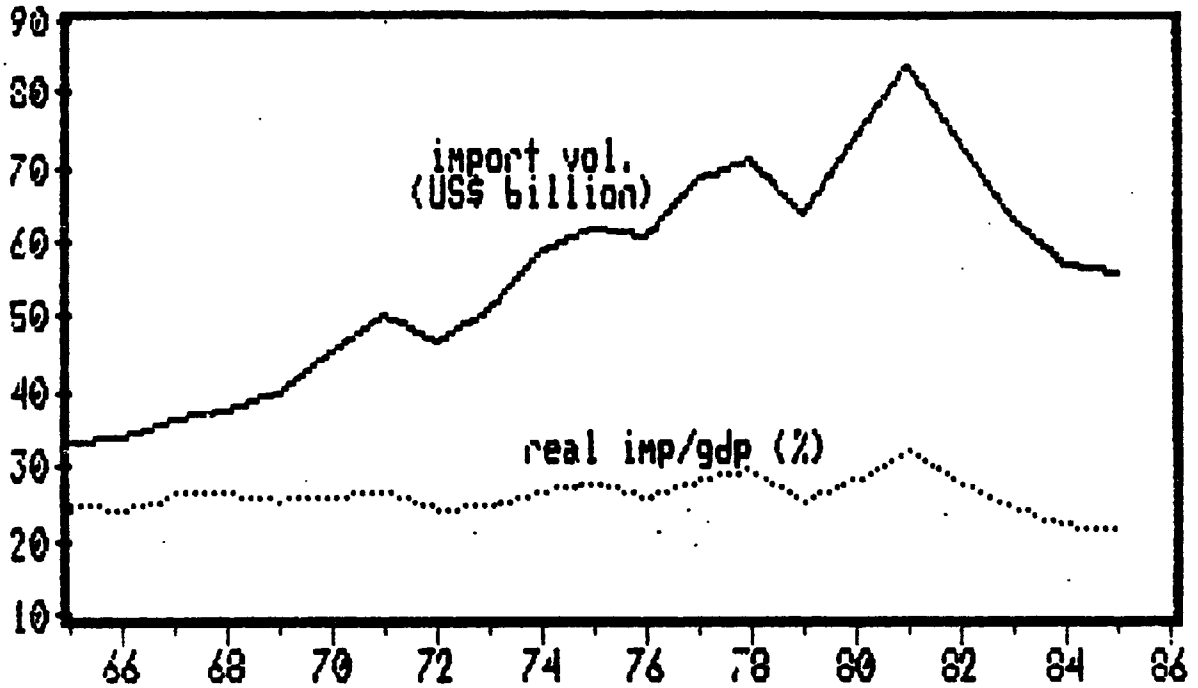
11. Cross-country estimations by Pritchett (op cit) also suggest an inverted U curve relating the income elasticity to per capita income, as well as a positive relation between this elasticity and income growth. The poorest countries have the smallest income elasticities, although even for a country with US$300 per annum per capita income, the predicted elasticity is 0.9. Accordingly, growing economies, especially approaching middle income levels, can have income elasticities exceeding that of the rest of the world. In addition these economies are expected to grow (at say 4 percent) faster than the industrial economies (say 2-3 percent). If the implied differential in import demand were actually translated into imports, they would mean continued trade deficits. While such an outcome is part of development, it would be problematic depending on its size and its possibilities of capital flows to finance the gaps.

12. Price elasticities in Pritchett (1986) for developing countries are significant but less than unity. The average was -0.57. All but one of the six Sub-Saharan Africa countries, however, had price elasticities greater than one. The import demand elasticities with respect to the exchange rate or the dollar import price in Table 9 are also, on average, more than one. These estimates suggest significant responses of imports to relative price changes. It might be noted also that these effects do not always, and adequately, separate out the impact of foreign exchange constraints which are very important in the African context.

13. The above estimates are based on traditional OLS models that assume income and relative price changes explain import behavior. If, however, import financing, and therefore import controls, are binding constraints to imports, the above estimates would be biased and inconsistent for the usual simultaneous equation reasons. The critical role of foreign exchange constraints in explaining import behavior for developing countries was first studied by Hemphill (1974) and extended by Moran (1987). In the latter study, the external budget constraint as well as relative prices and income explain imports. Salehi-Isfani (1985) used foreign exchange reserves as a proxy for quantitative restrictions, in addition to income and prices, to obtain good explanations of import demand for Nigeria. Without specifying and estimating a complete model, instrumental variables techniques are used by Pritchett to recover consistent estimates of the income elasticity. Correction of the simultaneity seems to increase the median income elasticity by over 50 percent. The results hold for disaggregated import demand equations as well. The new estimates also strongly suggest that imports and income are simultaneously determined, and the causality needs to be disentangled to get better estimates of the underlying import demand parameters.

14. While the above types of estimates are essential in behavioral models, they are not the composite elasticities used in accounting frameworks. The latter can be computed from the Bank's BESD data base or the IMF's WEO. The BESD contains trade data as well as national income statistics. Elasticities based on the trade data in the BESD are below the results

Figure 1: IMPORT VOLUME AND REAL IMPORT SHARE IN AFRICA
(includes goods & non-factor services)



Source: BESD, IBRD.

Table 1: GDP GROWTH AND IMPORT GROWTH (INCLUDES GOODS & NON-FACTOR SERVICES)

	1965-73			1974-81			1982-86			1965-81			1965-86		
	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP
LDC	6.2	7.3	1.2	5.1	7.3	1.4	3.9	0.8	0.2	5.7	7.3	1.3	5.3	5.8	1.1
Africa	5.3	5.7	1.1	3.2	6.9	2.2	-0.7	-9.6	13.7	4.3	6.3	1.5	3.2	3.2	1.0
Africa (excl Nigeria)	4.5	5.2	1.2	3.4	3.3	1.0	0.3	-5.9	-19.7	4.0	4.3	1.1	3.1	2.4	0.8
Asia	6.5	11.1	1.7	5.8	10.8	1.9	6.9	7.0	1.0	6.2	11.0	1.8	6.3	10.1	1.6
EMENA	6.0	8.9	1.5	5.4	4.7	0.9	2.9	1.7	0.6	5.7	6.9	1.2	5.1	5.7	1.1
Latin America	6.3	7.9	1.3	5.0	6.8	1.4	1.3	-7.7	-5.9	4.7	7.4	1.6	4.7	4.0	0.9
Sub-Saharan Africa	5.4	5.6	1.0	3.1	9.3	3.0	-0.3	-10.8	36.0	4.3	7.3	1.7	3.3	3.2	1.0
SSA (excl Nigeria)	4.0	4.7	1.2	3.2	3.9	1.2	1.7	-3.9	-2.3	3.7	4.3	1.2	3.2	2.4	0.7
Low Income Cos	5.4	1.7	0.3	4.6	6.2	1.3	7.6	9.1	1.2	5.0	3.8	0.8	5.6	5.0	0.9
High Indebted Cos	6.3	8.1	1.3	4.9	7.6	1.6	0.9	-8.6	-9.6	5.7	7.9	1.4	4.6	4.1	0.9
35 SAL Cos	6.5	8.8	1.4	5.2	7.3	1.4	2.2	-3.1	-1.4	5.9	8.1	1.4	5.1	5.6	1.1
15 Major SAL Cos	6.4	8.5	1.3	5.9	8.0	1.4	2.3	0.1	0.0	6.2	8.3	1.3	5.3	6.4	1.2
8 African Cos	6.4	7.2	1.1	2.6	10.3	4.0	-1.6	-14.5	9.1	4.6	8.6	1.9	3.2	3.3	1.0
Memo Item:															
Cote d' Ivoire	7.1	6.7	0.9	6.4	7.6	1.2	-0.7	-2.5	3.6	6.8	7.1	1.0	5.1	4.9	1.0
Ghana	2.4	0.1	0.0	-0.5	-2.8	5.6	1.5	-5.0	-3.3	1.1	-1.2	-1.1	1.2	-2.0	-1.7
Kenya	8.5	5.3	0.6	4.8	1.1	0.2	2.9	-1.1	-0.4	6.8	3.3	0.5	5.9	2.3	0.4
Madagascar	2.5	0.8	0.3	0.3	-0.9	-3.0	0.7	-6.5	-9.3	1.5	0.0	0.0	1.3	-1.2	-0.9
Nigeria	7.9	10.2	1.3	3.0	21.5	7.2	-3.1	-21.9	7.1	5.6	15.5	2.8	3.6	7.0	1.9
Tanzania	5.8	8.8	1.5	2.5	7.5	3.3	1.4	2.6	1.9	4.2	8.2	2.0	3.5	6.9	2.0
Zaire	3.8	12.4	3.3	-0.8	-0.1	0.1	0.7	-3.4	-4.9	1.7	6.5	3.8	1.4	4.3	3.1
Zambia	3.6	6.4	1.8	1.6	-5.7	-3.6	-0.6	-3.9	6.5	2.7	0.7	0.3	1.9	-0.4	-0.2

Note: Data definitions see Annex Table 2. Data for Africa, Ghana, and Madagascar is covered up to 1985 only.

reported on the basis of WEO (see Annex Table 1).[1] On the other hand, the national accounts-based elasticities are closer to (though also below) the WEO-based numbers. For the present purposes, we utilize the results based on national accounts in Table 1. These are also less problematic than trade data when imports are to be compared with GDP in the same currency. By and large, the long-term composite estimates for developing countries are well above one: 1.3 for 1965-81 and 1.1 if the years 1982-86 are also included. The small, low-income countries are the only group with a less-than-one elasticity, while middle-income countries (not shown in the table) have an estimate of 1.4. The estimates are significantly higher during high growth periods and for faster growing country-groups. The post-1982 estimates are very volatile, showing the effects of sharp declines in the growth of GDP and imports. There are only limited country examples with composite elasticities significantly less than one during long periods of sustained growth.

Among the countries that have achieved a growth rate of 4 percent or more during 1965-81 and 1965-86, the ones that have had an import elasticity of less than one are Kenya, Malawi, Congo, Pakistan, Sri Lanka, Burma, Malta and Guatemala. It would be interesting to examine the factors behind their experiences.

1/ The differences seem to arise mostly from : (i) the fact that BESD covers 90 countries while WEO covers 120; and (ii) the differences in price deflators used. The deflators in the BESD's trade data seem higher than those in WEO. We are accessing the WEO data currently to understand these variations better.

Flexibility in the Imports-GDP Ratio

15. The composite elasticity for Africa for the high growth period 1965-81 are above one. Including Nigeria, it is seen that African imports grew more than twice as fast as GDP in the 1970s, while they have declined together in the 1980s. The long-term trend in imports-GDP appears flat for the countries in question with the exception of Ghana and Zambia which show long-term annual reductions in imports-GDP of 0.9 percent and 0.2 percent respectively; most other countries show no long-term trend. In fact, periods of import reduction have been followed by periods of catching up.

> If the past experience of a composite elasticity of more than one were to hold during 1982-90 as a whole for Africa, the import compression in 1982-86 would call for a high and positive elasticity during 1986-90 for the same GDP growth.

16. While the import-GDP ratio is relatively stable over longer time periods, it has varied significantly during shorter time periods. During 1962-83, the coefficient of variation (standard deviation/mean) of imports-GDP for the eight countries fluctuated between 20 percent and 40 percent. The accompanying graph implies that while over long time periods, import-GDP was stable, during shorter periods GDP has not accompanied import fluctuations fully. The compressibility in imports is evident especially in capital goods behavior. The fluctuations of fuel and capital goods imports explain a high proportion of the total import variability. Sub-periods of low overall elasticity (1968-72) show especially low estimates for capital goods and vice versa (1978-82). The 1965-81 average import composition for the eight countries was heavily weighted towards capital goods (36 percent),

intermediates (31 percent), and fuels (12 percent), while finished consumer goods and food accounted for about 7 percent and 14 percent respectively. The fact that over 75 percent of the imports are intermediates, fuels, and capital goods indicates that long-term growth is heavily dependant on imports and that long-term import-GDP flexibility would depend on the flexibility of the production sector rather than of consumer demand.

Table 2: IMPORT COMPOSITION

	Seven Countries a/		Eight Countries	
	1965-81	1982-86	1965-81	1982-86
Food	12.2	12.1	13.0	14.3
Non-food	6.5	8.0	6.9	6.9
Intermediates	32.9	28.3	33.0	31.3
Fuel	15.4	21.6	9.1	11.7
Capital Goods	33.0	31.0	38.0	36.1
Total Goods	100.0	100.0	100.0	100.0

a/ Excluding Nigeria.

Notes: These shares are calculated at current prices.

According to SITC one-digit codes, the above import categories are defined as follows: Food = SITC 0 (food and live animals) + 1 (beverages and tobacco) + 4 (animal and vegetable oils and fats). Non-food consumer goods = SITC 8 (miscellaneous manufactured goods) + 9 (goods not classified by kind). Intermediates = SITC 2 (crude materials, excluding fuels) + 5 (chemicals) + 6 (basic manufactures). Fuel = SITC 3 (mineral fuels). Capital goods = SITC 7 (machines, transport equipment).

Data sources 1975-83 imports data are taken from UNCTAD tapes, accessed through the TARS software (World Bank). 1984-86 imports data come from World Bank country division files, CEM's, RED's, as well as country statistical reports, GDP data are from the BESD tapes (World Bank).

17. The sectoral breakdown in the use of imported inputs in production is also very different. The imported inputs (i.e., capital goods, intermediates and fuels) to output intensities of major sectors were examined based on input-output tables for Côte d'Ivoire (1985), Kenya (1976), Madagascar (1983) and Zambia (1980). Agriculture is the least import-intensive sector, with non-food manufacturing being several times more import-intensive. Broadly speaking, agriculture, mining, food manufacturing and services are the least import-intensive and non-food manufacturing and utilities the most. The 1985 input-output matrix for Côte d'Ivoire contains disaggregated data on input requirements by subsistence and export agriculture. While subsistence agriculture is substantially less import-intensive than export agriculture, the latter, often together with food manufacturing, is still significantly less import-intensive than those for value added in other sectors. Relative import intensities in agricultural value added are also far less than the rest of the economy (Table 3). However, these coefficients should be interpreted cautiously mainly because they do not reflect indirect imports. If the indirect imports are taken into account it is likely that the import-output ratio in mining, and perhaps agriculture, would increase. Nonetheless, given the fact that the agricultural sector almost everywhere in Africa uses capital and manufactured intermediate inputs in very limited accounts, as other data sources also suggest, agriculture would remain substantially less import-intensive than manufacturing. It may appear surprising that services are more import-intensive than agriculture and in some countries even more intensive than food manufacturing. The reason is that services happen to include transportation, a highly import-intensive sector. If transportation were to be attached to the productive sector with which it is closely complementary, the import-intensity of all sectors would be higher than that of non-transportation services.

Table 3: RELATIVE IMPORT INTENSITY IN AGRICULTURAL VALUE ADDED
(1981-84 Average)

Country	Share of Agriculture in Total Value Added	Capital Import Intensity: Rest of Economy/ Agriculture	Intermediate Import Intensity: Ratio of Intermediate Inputs Intensity in Rest of Economy/ Agriculture
Côte d'Ivoire	0.29	27.8	7.9
Ghana	0.54	18.1	24.3
Kenya	0.29	9.3	2.2
Nigeria	0.30	16.7	28.2
Tanzania	0.45	20.2	11.4
Zaire	0.31	54.0	51.8
Zambia	0.15	4.4	.81

Source: Value added in agriculture and GDP are extracted from BESD.

Table 4: PROJECTED GDP AND IMPORT GROWTH RATES

	1986-90			1991-95		
	GDP	Imports	Imports/GDP	GDP	Imports	Imports/GDP
Ghana	5.0	8.1	1.6	4.0	3.2	0.8
Côte d'Ivoire	2.7	4.0.	1.5	5.0	5.1	1.0
Kenya	5.1	2.4	0.5	5.1	4.8	0.9
Madagascar	3.3	4.2	1.3	3.8	3.8	1.0
Nigeria	1.6	-8.5	-5.3	4.5	6.4	1.4
Tanzania	3.8	4.4	1.2	4.2	2.9	0.7
Zaire	3.3	1.6	0.5	4.1	2.8	0.7
Zambia	2.9	5.3	1.8	4.1	3.3	0.8

Source: Preliminary projections by country economists, January 1988.

Past Experience vs. Future Outlook

18. The 1965-81 weighted average elasticity for the eight countries was 2.0, and 1.3 if Nigeria were excluded. The Region's country projections available to us seem implicitly to recognize, to some extent, both the flexibility in imports-GDP and the limits to such flexibility over long time periods. In some country cases, the acute import reduction in the 1980s is envisaged to be followed by elasticities that are at least as high as long-term trends -- in other country cases, however, this is not so.

> The weighted average of the elasticities in country projections -- 0.3 for 1986-95 and 0.9 if Nigeria were excluded -- are lower than long-term historic trends and much less than what would be needed to permit the catching up mentioned earlier. This issue of the import-GDP consistency should, however, be reviewed in light of changing structures and policy, and it will remain pertinent even if the import financing picture improves.

19. The extent to which the future can be different from the past might depend on a number of factors. The question of "excesses" in past imports associated with aid financing was already mentioned. If reduction of past disincentives to agriculture and complementary policies mean extended relative growth in agricultural production, this could imply a lower import-GDP ratio than otherwise. Industrial restructuring would imply changed, if not lowered, import needs. The role of the public sector can also influence import levels, since the levels and kinds of public spending are not neutral in their import implications. Better public sector management could also lead to greater import efficiency. Trade reforms can affect import-GDP ratio in opposite

directions. On the one hand, it can lower the import demand by shifting the composition of output towards sectors that are less import intensive and that have suffered negative protection (especially agriculture). Also, trade reforms may contribute to lowering the overall capital-labor ratio of the economy, since industry that has been protected is likely to be relatively more capital-intensive and more dependent on imported intermediates. This latter effect is reinforced if trade reform is combined with domestic reforms oriented to permitting a more efficient operation of the labor and capital markets. From a situation of an overvalued domestic currency and a high fiscal deficit, movements towards a better equilibrium might lower the import demand and the import-GDP ratio. (These, however, may be one-time changes and not necessarily continuous reductions). On the other hand, the direct effects of trade reform on imports is positive to the extent that they reduce import restrictions. Export promotion often requires making available imported (and domestic) inputs needed in production at world prices.

20. Indices of trade liberalization have been estimated by Papageorgiou, Michaely, and Choksi (1986) for several countries for the period 1960-83. Illustrative figures calculated on their basis show the relationship between the indices of trade liberalization, real exchange rates and import intensity (defined as merchandise imports-GDP) for seven non-African countries that have experienced significant trade liberalization. In general, a positive correlation exists between import intensity and trade liberalization. This impression is confirmed from simple econometric exercises that explain the import-GDP ratios by the degree of trade liberalization and other variables such as real exchange rate, difference in the rate of growth of agriculture vis-a-vis the rest of the economy, and public deficit as a proportion of GDP. The coefficient of the trade liberalization variable is highly significant for

three of the seven countries and mildly significant in another two. The estimates indicate that for a 10 percent increase in trade liberalization -- without a real exchange rate adjustment -- import intensity (import-GDP ratio) increases between 2 percent and a maximum of 12 percent. This effect, however, is considerably dampened in most countries if trade liberalization is combined with a real devaluation. A 15 percent real devaluation more than offsets the effect of 10 percent increase in the trade liberalization in all the countries considered. Thus, countries currently undergoing trade reforms can experience a moderate increase in their import dependence,[2] but exchange rate depreciation and reductions in the fiscal deficit might substantially reduce such effect.

21. Most of the African countries examined here have recently implemented trade reforms in varying degrees. Zaire has abolished import licenses for most imports and the tariff structure has been simplified and its variance is being reduced. In Madagascar, import permits have been removed from some 25 percent of total imports in value terms and plans exist to extend the free import regime to about 75 percent of the import bill in the near future. Additionally, a process of unifying the tariff structure is underway. Côte d'Ivoire has moved in the direction of replacing import licenses with tariffs. Import reforms have been somehow less pronounced in other countries. Export reforms have been even more widespread than import reforms. For example, Zaire is in the process of eliminating export taxes and licenses on manufactured goods as well as agriculture. However, certain mineral and agricultural products can be exported only by state agencies. Ghana has

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2/ It should be noted, however, that import-financing has often gone hand in hand with trade reforms, producing this correlation.

abolished export permits, and export taxes on natural resources have been replaced by extraction taxes. Tanzania has eliminated export taxes affecting major agricultural commodities such as cotton, coffee, tobacco and sisal.

22. These types of reforms, however, do not necessarily imply a dramatic opening up of imports, but they are more in the direction of a rationalization of trade regimes. In most cases, the import-GDP ratio has actually fallen during the reform process. As shown in Annex Table 2 the import-GDP ratio has hardly changed during 1982-86 compared to 1965-81 in the group of countries undergoing structural adjustment, and it has actually declined in the 8 African countries in question. A significant increase has occurred only in Asia. Africa's long-term import-GDP ratio is considerably above the developing country average (p. 55). Whether future import-GDP relation can be more flexible than in the past will depend on the size and nature of further structural and policy changes and their effect on imports.

III. SECTORAL GROWTH AND IMPORT REQUIREMENTS

Agricultural Supply

23. This section explores the extent to which changes in agricultural production and food manufacturing affect the import-growth coefficients. To obtain a quantitative handle on the order of magnitude, we assume constant returns to scale in production of agriculture (Q_A) and non agriculture (Q_N), assume competitive behavior, and represent the demand for imported inputs (M) as follows:

$$(1) \qquad M = \alpha_A (w, p_K, p_M) Q_A + \alpha_N (w, p_K, p_M) Q_N$$

where α_A, α_N are the imports/output ratios of agriculture and non-agriculture, respectively

w is the wage rate, P_K is the price of capital and p_M is the price of imported inputs and other intermediates .

For given factor prices, the α coefficients are fixed, and the rate of change of imports would be:

$$(2) \qquad \hat{M} = \beta \hat{Q}_A + (1 - \beta) \hat{Q}_N$$

where $\beta = M_A/M$ is the share of agricultural imports in total imports, and $\hat{}$ indicates the rate of change. Furthermore, we assume that an index of total output can be approximated by a Cobb-Douglas index $Q = Q_A^{\gamma} Q_N^{1-\gamma}$ where Q is total output and $0 < \gamma < 1$ is the share of agricultural in total output. Combining (1) and (2) the import growth rate is:

$$(3) \qquad \hat{M} = \left[\beta - \gamma \frac{(1 - \beta)}{(1 - \gamma)}\right] \hat{Q}_A + \frac{(1 - \beta)}{(1 - \gamma)} \hat{Q}$$

Given constant returns to scale, a balanced growth (i.e., $\hat{Q}_A = \hat{Q}$) leads to a unitary import elasticity with respect to output.[2a] If, however, agricultural growth accelerates keeping the total growth rate constant, import growth will decelerate, becoming lower than output growth provided $\gamma > \beta$:

2a/ $$\frac{\partial \hat{M}}{\partial \hat{Q}} \Bigg|_{\hat{Q}_A = \hat{Q}} = \beta - \gamma \frac{(1 - \beta)}{(1 - \gamma)} + \frac{(1 - \beta)}{(1 - \gamma)} = 1$$

$$(4) \qquad \left.\frac{\partial \hat{M}}{\partial \hat{Q}_A}\right|_{\hat{Q} \text{ Constant}} = \beta - \frac{\gamma\,(1-\beta)}{(1-\gamma)} = \frac{\beta-\gamma}{1-\gamma}$$

24. In general, if the output share of sector i is greater than its share in total imports (i.e., if $\gamma_i > \beta_i$), and if that sector grows faster than the rest of the economy, the import elasticity with respect to growth decreases. The share of imported inputs to agriculture in total imported inputs is typically quite low (below 10 percent) for most African countries as shown in Table 5. The γ coefficient, approximately interpreted as the share of agricultural output in total output, is about 0.19 for Côte d'Ivoire, 0.24 for Kenya and 0.31 for Madagascar. For $\beta = 0.10$ and $\gamma = 0.25$, equation (4) gives a value of -0.20 (and between -0.15 and -0.32 for the eight countries).

25. The implication is that for each percentage point that agricultural growth accelerates, given the overall growth rate, the rate of growth of imported inputs would decrease by 0.2 percentage points. Consider, for example, a country whose GDP is growing at 2.5 percent per year on a balanced sectoral basis with imports also growing at 2.5 percent. If the share of agriculture in output is 25 percent, the global 2.5 percent growth rate would also result from a 3.5 percent agricultural growth and 2.17 percent non-agricultural growth. This would, however, reduce the import growth from 2.5 percent to 2.3 percent per annum and the income elasticity with respect to imports from 1 to 0.92. This can be a short-run and even perhaps an intermediate run phenomenon but in the long-run, the import elasticity would again be unitary. The greater is the share of agriculture in total imports the smaller would be the effect on the import elasticity; the higher the output share in agriculture, the larger would be the effect.

Table 5: AGRICULTURAL IMPORTS OF CAPITAL AND INTERMEDIATE GOODS
(in percent)

	Share of Capital Goods Imports into Agriculture as a Percent of Total Capital Imports		Share of Intermediate Imports into Agriculture As Percent of Total Intermediate Imports	
Period	1966-68	1981-83	1966-68	1981-83
Côte d'Ivoire	10.9	1.4	3.8	4.9
Ghana	2.0	5.1	3.3	4.6
Kenya	5.9	4.2	4.7	15.7
Madagascar	4.7	2.8	4.4	8.1
Nigeria	2.0	2.5	3.9	1.5
Tanzania	4.9	3.9	0.2	5.7
Zaire	3.7	2.3	0.0	2.4
Zambia	4.5	3.9	4.7	17.9

Notes: Agricultural capital imports SITC 712 (Agricultural Machinery).

Total capital imports: SITC 7 (Machinery and Transport Equipment).

Agricultural intermediate imports: SITC 56 (Manufactured Fertilizers) + 27 (Crude Fertilizers) + 5992 (Pesticides) + 6951 (Agricultural Hand Tools).

Total intermediate imports: SITC 2 (Raw materials) + 5 (chemicals) + 6 (Basic Manufactures) - 54 (medical products) 55 (perfume and cleaning products).

Source: UNCTAD trade data system.

26. The change in imported input/output ratio through time can be derived from:

$$(5) \qquad \left(\frac{\hat{M}}{Q}\right) = \beta\,(\hat{S}_A + \hat{\alpha}_A) + (1 - \beta)\,(\hat{S}_N + \hat{\alpha}_N)$$

where $\left(\frac{M}{Q}\right)$ is the imported input/output ratio;

S_A^Q and S_N are the shares of agricultural and non-agricultural output, respectively, in total output;

α_A and α_N are the sectoral input/output ratios; and $\hat{}$ denotes rate of change.

If both the sectoral shares and the sectoral import/output coefficients in (5) are constant the aggregate import/output relationship will also be unchanged. If $\beta < 0.5$ (as is the case in all African countries considered and $\hat{S}_A > 0$ (note that since $S_N = 1 - S_A$, $\hat{S}_A = -\hat{S}_N$), the $\left(\frac{\hat{M}}{Q}\right) < 0$. The smaller is β, the more is this decline in the import/growth relationship. Similarly, changes in α_A and α_N can have significant effects on $\left(\frac{\hat{M}}{Q}\right)$.

27. Table 6 shows our estimates of the potential effect of increased relative growth of agriculture on the growth of imports based on equation 4. The first two columns show the estimated values of the coefficients γ and β and the third column shows the effects of a 1 percent acceleration of growth in agriculture -- holding the average total growth constant -- on the growth of imports. The highest potential for import growth deceleration is where the share of agriculture in GDP is high and where the β coefficient is low. In

Tanzania, Ghana and Madagascar, the effect of increased agriculture growth by one percentage point (keeping the overall growth near constant) is to decelerate import growth by more than 0.6 percentage points. Countries with intermediate potential (above -0.3) are Zaire and Côte d'Ivoire, while Kenya, Nigeria and, particularly, Zambia appear to have a low potential in this respect. Note that Kenya and Côte d'Ivoire have very similar agriculture shares in GDP but the fact that the β coefficient is much smaller in the latter than the former, means that Côte d'Ivoire has a moderate potential and Kenya a low potential in finding any deceleration in import growth in this way.

Table 6: RELATIVE GROWTH IN AGRICULTURE AND THE IMPORT-GROWTH RELATIONSHIP

Country	Share of Agriculture in GDP (γ)	Share of Agric. Imported Inputs to Total Imported Inputs (β)	Effects on Import Growth of a 1% Point Compensated Acceleration in Agricultural Growth (percentage points)
Ghana	0.45	0.05	-0.72
Côte d'Ivoire	0.28	0.04	-0.32
Kenya	0.26	0.12	-0.19
Madagascar	0.43	0.06	-0.65
Nigeria	0.21	0.02	-0.24
Tanzania	0.51	0.05	-0.94
Zaire	0.29	0.02	-0.38
Zambia	0.11	0.10	-0.01

28. Two recent studies have estimated aggregate agricultural supply responses to price changes for some of the African countries. Table 7 provides the short- and long-term estimates for total agriculture and cash crops, showing high values for the latter and small responsiveness for the former.[3] Given the responsiveness of cash crops, a combination of policies

Table 7: AGGREGATE AGRICULTURAL PRICE ELASTICITIES OF OUTPUT SUPPLY FOR AFRICAN COUNTRIES

	Total Agriculture a/		Cash Crops b/	
	Short run	Long run	Short-run	Long-run
Côte d'Ivoire	0.13	0.13	0.90	1.5
Ghana	0.20	0.34	0.40	1.0
Kenya	0.10	0.16	0.20	2.0
Madagascar	0.10	0.14	0.20	0.50

Sources: a/ Bond (1983).
b/ Berthelemy and Morrisson (1985).

improving the domestic real prices of agriculture and expanding investments in it can lead to an expansion, not only of the cash crop sector but also of the subsistence sector. A study by Siggel (1986) on Zaire is one of the few analyses that provide estimates of effective protection rates on a sectoral basis. Unfortunately, the data are only for 1970-73. Siggel reports negative effective protection for both the agricultural and food manufacturing sectors of the order -40 percent and -42 percent, respectively. Data for Nigeria

3/ A study by Peterson (1979), however, obtained aggregate agricultural supply elasticities ranging between 1.25 and 1.66 for 25 developing countries including some from Africa.

corresponding to 1980 in the World Development Report (1986) indicates that the relative protection of agriculture vis-a-vis the manufacturing sector is about 0.35. This tendency may have been reversed to some extent in the eighties, but there seems to have been policy reversals and continuing discrimination against agriculture to a significant degree. The instability of relative prices may also partly explain the rather disappointing performance of agriculture and its slow price response: the coefficient of variability of the agriculture/non-agriculture relative prices for the period 1970-85 ranges between 7 percent for Côte d'Ivoire to 21 percent for Zaire. There is a negative correlation (-0.44) between the coefficient of variability of the relative price of agricultural commodities and the average growth rate of agriculture GDP for the period 1971-85 for the eight countries. Despite progress, there also remain large disincentives to agriculture exports (Annex Table 4). Furthermore, the ratio of farmgate to border prices of various other agricultural commodities, both export and import substitutes, is in general substantially less than one, according to Binswanger and Scandizzo (1983). In Senegal, for example, this ratio was about 0.6 for groundnuts and 0.65 for cotton (both are export commodities). For import substitutes, rice domestic prices were about 55 percent of border prices in Ghana, while they were 80 percent in Senegal, although this has increased subsequently. In Zambia, domestic maize prices were only 75 percent of index prices while groundnuts were about 70 percent of border prices.[4]

4/ For additional estimates, see Jaeger (1987). For the period 1970-85, he calculated official producer price/world price ratios for export and import-competing commodities in Kenya, Mali, Malawi and Nigeria.

29. According to the foregoing, changes in the sectoral structure of growth can have significant effects on import requirements of African countries. The secular trend of declining agricultural share in production would raise the import intensity of GDP. On the other hand, emphasis has been laid in recent years on expanding the growth rate of agriculture and related sectors, partly via the removal of disincentives. Increased domestic production in agriculture reduces food imports; the share of food imports in total is 10-15 percent. The lower import-intensity of agricultural production is particularly significant.

> To the extent that policies of reversing price disincentives in agriculture and other complementary policies increase the sector's growth, they would also, at least temporarily, reduce the import-growth coefficients.

This possibility per se, however, should hardly be grounds to consciously try to change sectoral output composition. Furthermore, the effects of changes in production in subsistence agriculture and their effects on import requirements need to be examined thoroughly.

Industrial Restructuring

30. The industrial sector is disproportionately import-intensive in production in the countries examined. The imported input to output ratio in Côte d'Ivoire, Kenya, Madagascar and Zambia, according to input-output tables, are several times higher in non-food manufacturing than in the rest of the economy. On the whole, the import dependence of manufacturing activities is high relative to the rest of the economy, although this indicator varies

significantly from country to country. For example, in 1952 only 25 percent of manufacturing inputs were imported in Zimbabwe compared to over 70 percent in Ghana and Tanzania. The final manufacturing goods, on the other hand, have been well protected, indicated by declining shares of final imports in manufacturing supply (see especially the Bank reports on Tanzania, 1987 and Kenya, 1987). The combination of protection to final goods and high import dependency in production imply relatively high effective protection rates.

31. A number of industrial sector reports[5] discuss wide-ranging problems faced by the sector, some of which are directly related to the import question. An in-depth review of Tanzania at the firm-level has been revealing. A wide dispersion in protection and efficiency is noted, with efficient manufacturing industries being denied scarce resources which flow disproportionately to inefficient firms. Survey results suggest that firms which have substantially higher effective protection rates and are larger and more import-dependent are also less efficient. Reviews of Ghana and Ethiopia also indicate the association between high and widely varying rates of effective protection and high and varying inefficiency. Overall efficiency is superior in Kenya and Zimbabwe; at the same time, these cases also reveal a positive relation among protection, import dependency and inefficiency (in terms of domestic resource costs.)

32. The high and rising import dependency in Tanzania coexists with low and declining capacity utilization -- 53 percent in 1976 to 25 percent in 1985. Imports to support the 25 percent capacity utilization are six times the value of industrial exports. Severe underutilization of capacity is also found in Ghana. While increased imports can increase utilization of existing

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5/ See World Bank 1987a,b,c,e,g.

capacity, the studies do not conclude that such increased capacity utilization is the answer. A fundamental problem noted in Ghana and elsewhere in Africa is excess capacity with respect to domestic demand and availability of imported and domestic inputs. In Tanzania, only selective increases in the utilization of existing capacity are recommended together with industrial reorientation with better allocation of recurrent sources. In Zimbabwe, on the other hand, existing capital stock is highly utilized, but old. The sector is working at 80 percent capacity, but there is the need for capital replacement.

33. Although there are no conceptual grounds to expect this result, the work on Tanzania also brings out a broad inverse relationship between efficiency and capital intensity in general. Activities with a higher than average capital-labor ratio have a 15 percent lower productivity than those with below average capital-intensity. Similar results are found in the Kenya work. Capital-intensive activities seem more inefficient, a finding corroborated by regression analysis. The link of this relationship with effective protection is also noted. Price interventions -- interest rate subsidies and wage protection -- which encourage capital intensive production would also than seem to be associated with relative inefficiency. Increased import content of production seems to go with these features, and policy adjustments that are typical under structural adjustment would seem to have an import-saving characteristic.

34. The foregoing has brought out elements in an industrial strategy that have the effect of reducing import intensity of growth. The need for rehabilitation and new capital equipment has also been noted which have the opposite effect. Furthermore, a decline in overall imports needed in production during the 1980s must also be taken into account. As shown in

Table 8, the import shares in GDP have declined in 1982-88 compared to 1965-81. These reductions are also true for intermediate and capital goods. (See p. 32 also).

Table 8: IMPORTS' SHARES IN GDP

	Seven countries a/		Eight countries	
	1965-81	1982-86	1965-81	1982-86
Food	2.3	1.7	2.3	1.7
Non-food consumer goods	1.2	1.1	1.2	0.8
Intermediates	6.1	3.9	5.9	3.8
Fuel	2.9	3.0	1.6	1.4
Capital goods	6.2	3.9	6.8	4.4
Total	18.7	13.6	17.8	12.1

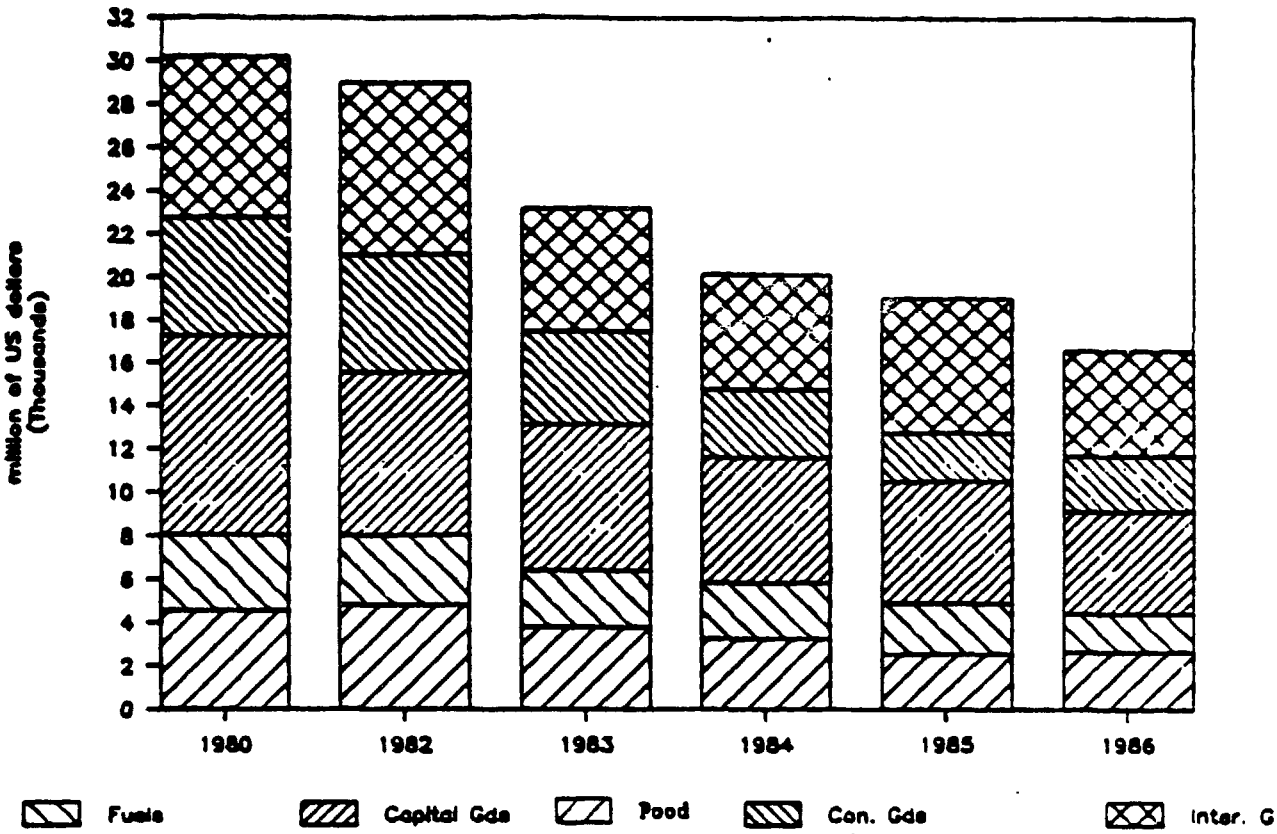
a/ Excluding Nigeria.

Notes: These are shares of import goods calculated at current prices. For a description of import categories see Table 2.

Source: Same as Table 2.

These changes both reflect the flexibility in the import-GDP relation and raise the question of how much further compressibility can be expected in the face of the need for restoring much-needed imports. The composition and quality of imports remain key concerns in relation to needed structural changes.

Figure 2: Composition of Africa's Imports



Source: Based on data provided by IECSE

IV. MACROECONOMIC POLICY AND IMPORTS

Aggregate Demand

35. Imports of final goods and capital goods are more directly related to total expenditures or absorption than to real income, while imports of intermediate goods are probably directly dependent on real income. The absorption-real income ratio seems to have varied significantly over time in most of the African countries examined. Moreover, absorption can also be affected by macroeconomic policies, particularly fiscal policies. To the extent that absorption grows at a slower pace than real income during adjustment, the import-growth relationship would be lowered at least in the short term. The composition of absorption (i.e., private consumption, government consumption, private investment and public investments) can also be expected to play a significant role in determining imports. The various components of absorption do not in general exert the same pressure on imports. When the import intensities of the components of total absorption are significantly different, changes in the structure of absorption have important effects on the import-GDP relationship. Such adjustment of the structure of absorption may have a more significant effect and relevance than the adjustment of total absorption.

36. A real devaluation can have expenditure-switching effects through increasing the price of tradeables, including importables, possibly also reducing the import-growth coefficients. This effect depends on the extent to which the real domestic price of imports increases through a nominal devaluation. If quantitative import restrictions are significant, to begin with, the effect of a devaluation is likely to be redundant. Moreover, a nominal devaluation will change the relative price of tradeables (including

imports) only if complementary wage, fiscal and monetary policies are in effect. Even if devaluation increases real prices of tradeables and imports, import substitution would depend on the supply response that it induces, which in turn depends inter alia on factor mobility, technological and human capital availability, and on the adequacy of infrastructure and other public goods to permit a realignment of production toward tradeables which are likely to be a more intensive users of these goods.

37. The quantitative significance of exchange rate and absorption/GDP adjustments on imports can be brought out by the estimation of a reduced form import equations of the following type (all variables are in the log form).

$$(6) \qquad m_t = b_0 + b_1 Y_t + b_2 (A/Y)_t + b_3 e_t + b_4 P_{mt} + b_5 m_{t-1}$$

where m_t are aggregate real merchandise imports in time t,

Y_t is real GDP

A_t is absorption

e_t is the exchange rate (local currency per dollar) deflated by the GDP price deflator

P_{mt} is the dollar import price index.

38. The present specification includes the absorption-GDP ratio, which is closely related to net capital inflows: an excess of absorption over GDP reflects increases in net capital inflows and declines in reserves. Thus A/Y in part reflects the positive relationship of imports to external borrowing and financing. In contrast to conventional import demand specifications that include a "domestic" price of imports (P_f) as the product of the world price and the effective exchange rate (e), equation (6) includes an external

(dollar) import price (p^*) and the exchange rate as separate variables. The domestic price of imports is an aggregate price of: (i) fully tradeable imports, with prices that can be approximated by the parity specification $p_f = (1 + t)ep^*$, where t is the average tariff, and (ii) imports subject to binding quantitative restrictions, which have an endogenous domestic price. This latter price depends on domestic demand conditions, and factors that shift domestic supply, including the exchange rate (as it affects the cost of imported inputs) and the import quotas. Therefore, the effects of e and p^* on imports are not likely to be identical as imposed by conventional estimates using p_f as an explanatory variable.

39. The long-term import elasticities for 1965-83 in Table 9 show the expected signs and are generally significant. The high real income elasticities obtained by previous studies are confirmed by a value of over 1 on average for the GDP coefficient. The average cross country elasticity values for the absorption/GDP and exchange rate variables are approximately 2 and -1, respectively. For example, a 2 percent real income growth would be achieved with about a 0.5 percent expansion of imports if the absorption/GDP ratio is falling by 1 percent. If at the same time the real exchange rate is depreciating by 0.6 percent, there would be little increase in imports. The hypothesis of identical elasticities cannot be statistically rejected only for Côte d'Ivoire and Kenya. Thus the conventional procedure of using the calculated domestic price P_f instead of e and P_m as separate regressors is justified only in 2 of the 8 countries. Furthermore, insofar as absorption is in part determined by GDP, exchange rate and import prices, the model should be closed with an absorption equation which should be jointly estimated with the import demand equations using simultaneous equation methods. This would permit the calculation of the total effect of the rest of the independent

Table 9: LONG-TERM AGGREGATE IMPORT ELASTICITIES

	Real GDP	Absorption/ GDP	Exchange Rate	Dollar Import Prices	R^2
Côte d'Ivoire	1.14	-0.52	-1.04	-1.03	0.96
	(7.99)	(-0.64)	(-9.31)	(-2.43)	
Ghana	1.07	5.04	0.43	0.21	0.72
	(0.46)	(0.88)	(1.61)	(0.29)	
Kenya	0.77	1.99	-1.09	-0.86	0.68
	(3.17)	(3.44)	(-4.36)	(-2.17)	
Madagascar	1.50	2.72	-1.28	-1.43	0.79
	(2.92)	(2.51)	(-1.99)	(-3.79)	
Nigeria	0.94	2.77	-0.92	-0.41	0.95
	(2.48)	(4.31)	(-5.86)	(-0.90)	
Tanzania	0.89	3.58	-0.21	-0.62	0.39
	(1.22)	(2.55)	(-0.51)	(-1.41)	
Zaire	2.75	0.90	-.40	-.98	0.86
	(3.18)	(0.74)	(-1.01)	(-3.32)	
Zambia	0.47	2.16	-1.87	-2.05	0.85
	(0.35)	(2.24)	(-1.98)	(-3.94)	

Note: t-statistics are in brackets; estimates for Tanzania, Ghana and Nigeria are based on the period 1965-86, while the rest are for 1965-83.

variables, including the direct effect as well as the effects via absorption changes. If the exchange rate also reduces the absorption-GDP ratio, then considering this indirect effect (the expenditure reducing effect) would enhance the actual effect of devaluation on imports.

40. Annex Table 4 shows absorption as a percent of GDP in the eight countries for 1970-85, while Annex Table 5 presents estimates of the real exchange rate for 1965-86. Together, these data show how, historically,

absorption has exceeded income and the real exchange rate has appreciated, as well as how demand management has produced changes in the opposite direction in some cases during the 1980s. The possibilities for further reduction in aggregate demand and real exchange rate depreciation vary from country to country. Although each country case is different, some representation classification seems useful.

> Taking absorption and the real exchange rate together, Kenya and Madagascar, and perhaps Côte d'Ivoire show a relatively steady pattern and do not show extreme disequilibrium. While the others indicate much greater disequilibria, Zaire and Zambia on the one hand and Ghana and Nigeria on the other have adjusted, in varying degrees and with differing scope for further action. Tanzania continues to show more disequilibrium in these respects.

While these figures suggest that there is room for further adjustment across countries, there are obvious limits to such possibilities. The relationship between absorption and GDP can be reduced somewhat, but the consequences in terms of employment and growth can be negative, particularly when this ratio reaches certain critical levels. Similarly, the use of nominal devaluation to adjust the real exchange rate can be very effective when the domestic currency is overvalued, and in the presence of complementary fiscal, monetary and wage policies, and seldom otherwise.

Structure of Absorption

41. In order to shed some light on the issue of the structure of absorption rather than its level, were the import equations reestimated using

disaggregated expenditures. The question is whether changes in the composition of expenditures, maintaining total expenditures constant, can have significant implications for imports. Expenditures were disaggregated into three categories, namely, private consumption, government consumption, and investment. One possible criticism of Equation (6) above is that if exports are exogenous, the equation would be very close to an identity (excess expenditures minus income equals trade deficit), although the fact that the dependent variable is only merchandise imports rather than total imports somewhat mitigates this problem. For this reason, income and the absorption-GDP ratio are now excluded, and substituted for by the three components of aggregate expenditures. Thus, the specification estimated is the following:

$$(7) \qquad m_t = c_0 + c_1E_1 + c_2E_2 + c_3E_3 + c_4e_t + c_5Pm_t + c_6m_{t-1}$$

where E_1 is real private consumption, E_2 is real government consumption, and E_3 is real investments. All other variables are previously defined, and as in (6), all variables are in log form.

42. Table 10 shows the long-term import demand elasticities from estimating (7) for each of the countries.[6] These results confirm the influence of the exchange rate in determining imports, but the quantitative importance of the exchange rate is somehow lower in this case than when total absorption

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6/ The high R^2 and t-statistics are generally high. The h test for no autocorrelation is rejected in 3 of the countries while in 3 more it is ambiguous and is accepted in two other countries. Moreover, all signs with the exception of private consumption in Ivory Coast have the expected ones. There are three other "wrong" signs but the coefficients are not significantly different from zero.

Table 10: LONG-TERM AGGREGATE IMPORT ELASTICITIES: 1965-82
(Ordinary Least Squares)

	E_1	E_2	E_3	e_t	ρ_{mt}	R^2	No Autocorrelation Hypothesis h Statistic
Ghana	-0.15	0.85	0.40	-1.01	-0.31	0.81	accept
	(-0.29)	(3.03)	(2.92)	(-1.66)	(-1.50)		[-1.65]
Ivory Coast	-0.55	0.64	0.22	-0.83	-0.54	0.98	reject
	(2.11)	(8.49)	(3.04)	(-14.65)	(-3.61)		[2.61]
Kenya	0.18	0.02	0.52	-1.03	-0.81	0.64	NA
	(0.13)	(0.03)	(2.76)	(-1.96)	(-1.00)		
Madagascar	0.75	0.96	0.10	-1.44	-1.33	0.77	reject
	(1.15)	(1.90)	(0.41)	(-2.06)	(-3.62)		[5.92]
Nigeria	-0.77	0.19	0.92	-0.63	-0.25	0.96	reject
	(-0.84)	(0.71)	(6.58)	(-1.06)	(-0.29)		[2.16]
Tanzania	0.90	0.61	0.88	0.38	-0.64	0.81	NA
	(1.38)	(2.92)	(4.33)	(0.69)	(-0.99)		
Zambia	0.35	-0.03	0.58	-0.92	-0.96	0.88	NA
	(0.66)	(-0.08)	(2.80)	(-1.04)	(-1.69)		
Zaire	0.38	0.57	0.49	-0.16	-0.68	0.86	accept
	(0.81)	(2.72)	(2.62)	(-0.53)	(-2.34)		[0.04]

rather than its components is considered. The effects of the different categories of expenditures on imports is quite heterogeneous. In Ivory Coast, Zaire, Madagascar, and Ghana it appears that government expenditure is the most import-intensive of all. This would imply that decreasing government consumption and increasing private consumption and/or investments by the same amount could result in a net decrease of imports. Nigeria and Tanzania appear to have the highest imported component in investment, while Ivory Coast and Madagascar have the lowest.

43. The net effect of a trade reform cum exchange rate adjustment package on the level of imports is thus uncertain, at least in the short term. While a trade reform effort may be seen as a partial opening up of imports, the impact depends on the nature and the size of reforms and on complementary policies. The widely proposed substitution of tariffs for quantitative restrictions, and reductions in the tariff dispersion, need not increase import levels, but only improve efficiency of the trade regime. A lowering of quantitative restrictions and tariffs will increase imports, but they can be compensated by a depreciation of the exchange rate, if the latter can indeed be translated into a real depreciation with supporting macroeconomic policies. Successful export protection almost always requires the increased provision of inputs at world prices. Any significant increase in non-traditional exports, therefore, may be expected to place increased demand on imports of inputs needed in production of exports.

44. The previous analysis concerns the determinants of imports, while the import-GDP ratios are also of concern. Furthermore, in estimating import equations it is likely that serious problems of simultaneity exist. Particularly in the case where there exist binding foreign exchange

constraints, the causal relation goes from real imports to real income rather than from real income to real imports, as postulated in conventional import demand equations. As indicated before, an overwhelming proportion of African imports consist of capital goods and intermediates. Thus, under conditions of import restrictions in response to binding foreign exchange constraints, real income would be largely determined by the import possibilities. It is likely that in part of the period under analysis, imports in much of Africa were essentially determined by foreign exchange availability rather than by demand factors. In other years, when foreign exchange constraints have been less restrictive, it is likely that imports have been largely determined by demand factors as specified in the previous models. Since it is very difficult to say a priori in what years of the sample period the foreign exchange restrictions were or were not binding, consistent estimation of the import equations may not be entirely feasible.

Foreign Exchange Variables

45. To shed some light on the role of foreign exchange availability in the determination of imports we extend Equation (6) to include a proxy for foreign exchange availability. In analyzing foreign exchange constraints on imports, authors have considered several explanatory variables (Hemphill, Moran, etc.) including some or all of the following: exports, capital inflows, changes in foreign exchange reserves. If one uses only a subset of these variables, however, the estimates are likely to be unstable because their effect will be heavily dependent on underlying stock variables such as net debt. The effect, for example, of an expansion of exports on imports will be very small for a country when highly indebted (it may use increasing export

revenues only to pay the debt service) while it will be much larger in a period of low debt (when exports may have autonomously expanded). If on the other hand all flow foreign exchange variables are used, then one is estimating something very close to an identity -- imports equal to foreign exchange available for imports.[7] The implication is that not all flow variables can be used, and that stock variables should be used to account for stock adjustment processes.

46. The basic issue is what variables (flow and particularly stock variables) should be used. If domestic and foreign exchange wealth are perfect substitutes, foreign exchange constraints are not likely to be binding. If, for example, domestic assets or income in domestic currency could be freely used to pay debt or imports, consideration of foreign exchange constraints would be unnecessary. On the other extreme, if domestic wealth and foreign exchange wealth cannot be substituted at all, the issue of foreign exchange availability becomes critical. Many LDCs are likely to have some possibilities of substitution (example: Latin American countries in their debt swap operations suggest some substitutability) at varying degrees. It is possible that African countries are closer to the extreme of little substitutability than to perfect substitution, and therefore we assume a dichotomization between the allocation of domestic wealth and of foreign exchange wealth.

47. Under this assumption one can postulate an intertemporal problem where an increasing and concave function of imported goods (welfare function)

7/ Some previous studies have actually used practically all flow foreign exchange variables in explaining imports.

is maximized subject to an intertemporal budget constraint (or feasibility constraint) indicating that the present value of future excesses of imports over exports need to equal the current stock of foreign exchange assets defined as the level of foreign exchange reserves less the stock of net international debt. Solution of this problem gives the import level as a function of the net stock of foreign exchange assets, exports (current and expected future exports), terms of trade, real income or total real expenditures and the real domestic price of imports (the objective function is also a function of these last two variables, i.e., the effectiveness of imports in promoting welfare is dependent on real income level and domestic prices).

48. Table 11 presents long-term import elasticities specified in a manner consistent with the previously discussed intertemporal model. Specification includes the same variables as the static import Equation (6) in addition to the foreign exchange variables, namely the value of exports and debt. In this specification these two variables are considered as a ratio rather than as separate variables. All the coefficients associated with this ratio are positive as expected, but not all of them are significant. The coefficients for Zaire and particularly for Nigeria are not significant. The virtual value of zero of the coefficient for Nigeria is reasonable, as Nigeria is not likely to have suffered serious foreign exchange restrictions during the period under analysis. The lack of significance of the coefficient for Zaire is less understandable.

49. A remarkably result is the high degree of similarity of the export/debt elasticities of imports for Côte d'Ivoire, Kenya and Tanzania which fluctuate between 0.21 to 0.23, while the elasticities for Ghana and

Table 11: LONG-TERM IMPORT ELASTICITIES CONSIDERING FOREIGN EXCHANGE CONSTRAINTS (1970-86)

	Real GDP	Absorption/ GDP	Exchange Rate	Dollar Input Price	Export/ Debt	- 2 R
Cote d'Ivoire	0.88	0.85	-0.72	-0.43	0.22	0.97
	(3.53)	(3.35)	(-10.81)	(-2.71)	(2.82)	
Ghana	0.24	4.72	-0.07	-0.54	0.65	0.82
	(0.22)	(1.71)	(-0.42)	(-1.90)	(2.74)	
Kenya	0.88	2.63	-0.69	-0.62	0.21	0.94
	(4.78)	(10.21)	(-6.03)	(-7.85)	(5.75)	
Madagascar	1.78	2.37	-0.51	-0.56	0.09	0.82
	(2.03)	(2.58)	(-1.67)	(-2.85)	(2.24)	
Nigeria	3.06	3.19	-0.86	-1.02	0.01	0.97
	(14.51)	(6.89)	(-11.08)	(-3.23)	(0.00)	
Tanzania	1.58	3.09	-0.38	-0.58	0.23	0.87
	(1.63)	(3.40)	(-1.46)	(-2.45)	(2.64)	
Zaire	1.92	1.09	-0.10	-0.71	0.06	0.95
	(1.52)	(0.97)	(-0.55)	(-5.29)	(0.94)	
Zambia	-3.00	2.30	0.54	0.46	0.56	0.95
	(-1.48)	(1.14)	(1.12)	(0.39)	(2.25)	
Median	1.23	2.45	-0.51	-0.58	0.22	

Notes: h-statistic or AR1 tests showed that only the equation for Madagascar had autocorrelation. All estimates are OLS except those for Madagascar which used a CORC procedure to correct for autocorrelation. The medians are computed excluding estimates with "wrong" signs. The median real GDP elasticity excludes Nigeria (as well as Zambia) due to the extremely high elasticity obtained for Nigeria.

Zambia are also similar at about 0.6. Of all the countries sharing a significant effect of the export/debt variable, Madagascar exhibits the lowest elasticity at 0.09, indicating that a 10 percent increase in indebtness causes a reduction of imports by less than 1 percent.

50. The exchange rate elasticities tend to diminish in absolute values in most countries from a median value of about -0.98 in the case where foreign exchange variables are not accounted (Table 9) to about -0.51 when these variables are considered. The income elasticities also become smaller in most countries with the exception of Nigeria and Tanzania which show a substantial increase. The general tendency for the price and income elasticities to fall is reasonable.[8] It is likely that the export-debt ratio is positively correlated with income and negatively correlated with the exchange rate. When the export/debt ratio is high, either exports are large pulling real income higher or the stock debt is low implying relatively less debt service payments and more availability of new credits, increasing real income. On the other hand, the real exchange rate is likely, at least partially, to respond to a deterioration of the external situation, thus being negatively correlated with the foreign exchange variables. The implication is that the positive income coefficient and the negative price coefficient in Table 6 were also capturing part of the effect of the export-/debt ratio. When we control for this ratio in Table 11, this indirect effects on real income and price are excluded, thus explaining the generally lower absolute value of the new exchange rate and price elasticities.

8/ Notice, however, that the periods of estimation are different; but this is also true when we compare the estimates of Table 11 with estimates for the same period, 1970-86, without accounting for the foreign exchange variables.

51. The complexity of the import effects of an adjustment package is brought out by the foregoing discussion. The rationale for policies of import liberalization is both to improve the efficiency of the trade regime and to increase the share of trade in GDP thereby contributing to growth. In the face of foreign exchange constraints, however, increases in imports would be of concern. The econometric results suggest that imports are affected significantly also by the types of public expenditure and the real exchange rate. An adjustment package that includes expenditure revisions and exchange rate depreciation, in addition to import reform, does not necessarily put an upward pressure on the import-GDP ratio.

VI. CONCLUSIONS AND FURTHER WORK

52. A wide range of estimates support the proposition that imports would grow at least as fast as output during long periods of sustained income expansion. This is particularly true if the effect on import demand of income is considered holding other factors the same. The income elasticity of demand for imports for the African countries examined is by and large above one. The price elasticity of demand is more than minus one. Thus the partial measured impact of income and of relative price changes on imports over the long-term has been more than proportionate. The estimates also indicate significant country differences in their income and price effects.

53. At the same time, the levels and variations of imports observed in Africa may be in good measure the effects of changes in aid financing and exports. The actual imports may, to a large extent, be the result of changes in foreign exchange availability which is reflected in the widespread QRs.

Nevertheless, the composite elasticity resulting from all these factors -- price, income, QRs -- has been far above one during the 1970s, but highly variable in the 1980s given reductions in imports and GDP. The import-GDP ratio in Africa has been well above the developing country average in the 1960s and 70s, and to a lesser extent in the 1980s. The import-GDP ratio for Africa and the eight countries in question was about 24 percent in 1965-81 compared to developing countries' and Asia's average of 17 percent. The import dependency of production in some of the African countries is more significantly higher than the developing country average. Smaller country sizes and less diversity in structure should explain a part of the higher import ratios in Africa. On the other hand, exchange rate overvaluation may have understated the past ratios statistically.

54. These trends argue for special attention to the financing requirements for imports needed for growth. The acute reduction in the imports of intermediate and capital goods in the 1980s seems to also imply the need to catch up -- to rehabilitate and rebuild productive capacity. If the past elasticities of over one were to hold approximately during the 1980s as a whole, the acute import reduction thus far would argue for especially high elasticities during the rest of the decade.

> For Sub-Saharan countries targeting GDP growth of 4 percent over a decade or more, long-term elasticities much less than one would not be realistic based on past patterns of growth. This is even more so if use of the past long-term elasticities were qualified by reference to the dip in importation in the recent past. In the aggregate and on the face of it, therefore, there would seem to be optimism regarding future import-output relation in the present projections.

55. The next question, however, is whether the past is a good guide for the future, and how the degree of dependence of growth on imports is likely to change. Considering that the African import-GDP ratios are above other developing country groups' ratios, how rigidly should the "base" be considered. To the extent there is considerable flexibility in this regard the high historical import elasticities with respect to income found in the 1970s do not necessarily mean that the import compression in the 1980s is a necessary obstacle to fast growth, at least for short periods of time. More significant for looking ahead over the medium-term are structural and policy changes that influence imports. Some of these effects may be one shot, whereas others are more sustained.

> The substantial variation in the import-GDP ratio already observed in the short-term highlights the flexibility in this relation. More importantly perhaps, structural and policy redirection in the future can change the import dependency: some factors would reduce it whereas others would call for more imports, but in differing compositions and quality of use from the past.

56. It was noted that the secular decline in agriculture's share of GDP would increase the import content of production. But changes in the composition of growth towards agriculture and food manufacturing which can result from reductions in past distortions may produce, as a by-product, temporary reductions in the dependence of growth on imports, both on account of lower food imports and the lower import-intensity of agricultural production. The paper has provided a simple framework which could be used to

quantify the implications of sectoral growth changes and factor price adjustments for import growth. The higher is agriculture's share in GDP and the lower is the share of agricultural imported inputs in total imported inputs (as in Tanzania and Ghana) the greater will be the reduction in import growth from accelerated agricultural growth. Much more work needs to be done for specific countries in order to make this framework operational. In particular, substantially more disaggregation at the sectoral level, especially to include the effects of subsistence production, is required. It was also indicated that in many cases a restructuring of industry to achieve greater efficiency would be associated with a lowering of import dependency, for example in Ghana. At the same time, different types of imports might be needed to meet the requirements of rehabilitation and redirection of industry, as in Tanzania, or increased imports might be needed to replace and modernize outdated capital equipment, as in Zimbabwe.

> The net effect of agricultural and industrial adjustments would depend on what happens to their relative sectoral shares and on the type of reorientation of production found efficient. These effects can usually be anticipated with available sector-level information.

57. The role of absorption as a determinant of imports was also examined. Changes in the absorption to income ratio can be an important determinant of imports, and policies that affect absorption have direct implications for imports and the import-growth relationship. While for some of the countries under consideration, adjustments of the level of absorption is feasible, this may also be a limited avenue for achieving further reductions in import-GDP

coefficients. Particularly significant effects of absorption on imports were found in Tanzania, Nigeria and Madagascar; recent absorption-GDP coefficients were especially high in Tanzania and Madagascar. A preliminary analysis of the relationship between the structure (rather than the total level) of absorption and imports was also performed.

> The results suggest that changes in the composition of absorption rather than the level of absorption can be especially significant in increasing the flexibility of overall import dependency. There could be high payoffs to examinations of expenditure categories, their import content and the question of excesses that may have been built up from past patterns of financing.

Government expenditures in the past seem to have been especially import-intensive: there may also be a relationship between this association and certain types of government interventions such as those of parastatals. Changes in the composition of expenditures, and perhaps a reduction of government interventions, might reduce the import-GDP ratio; detailed country studies of the structure of absorption are needed.

58. The role of the exchange rate and import reforms in affecting import dependency was also explored. Certain import reforms (for example substitution of QRs by tariffs) do not put an upward pressure on imports, whereas others (reduction of QRs for instance) do. How much of an effect the latter would have on imports is obviously an empirical issue. The empirical evidence suggests that an accompanying real devaluation per se has a significant negative effect on imports. The significance of this estimated

effect varies substantially among the countries . The degree of currency overvaluation is also vastly different; based on one index of the real exchange rate, considerable depreciation can be seen during 1984-86 in most cases, although there is still some appreciation compared to the 1980 level in Tanzania and hardly any change in Kenya and Nigeria (Annex Table 5). Devaluation can be an efficient tool in affecting imports and exports to the extent that the domestic currency is overvalued and there are complementary macroeconomic policies. Furthermore, while a real devaluation is seen to have a negative effect on imports, the impact on the import-GDP ratio also depends on what happens to GDP and exports as a result. Policies designed to reduce factor market distortions are also likely to reduce import demand. Reforms that address artificially low relative prices of capital goods and high wage rates might be effective in reducing import-growth coefficient.

59. Table 12 provides an overview of selected areas of change which affect imports, and a description of the expected effect on import-GDP coefficients. An acceleration in the overall growth in GDP is usually import intensive. In general, countries targeting to grow at 4 percent p.a. as opposed to the stagnation during the 1980s would need to factor in a significant increase in the import coefficients. The severe import compression of the 1980s accentuate the need for this effect. Changes in the composition of GDP, however, can also have significant effects on import demand. The estimates in this paper suggest that a one percentage point increase in agricultural growth holding GDP growth the same can be associated with a median deceleration of import growth by 0.3 percentage point. The range for this potential effect is fairly large, ranging from a low effect in Zambia, Kenya and Nigeria, moderate in Côte d'Ivoire and Zaire, to high in

Madagascar, Ghana and Tanzania. Increases in industrial share of GDP as part of a growth process would normally raise the import coefficients. However, industrial restructuring and lowered protection from past situation of inefficiency and import dependency can actually lower import-GDP ratios. Such prospects for lowering the import dependency are particularly strong in Ghana, Tanzania and Ethiopia, and moderate in Kenya; the opposite can also be the case as in Zimbabwe where the need exists for rehabilitation of capital.

60. The abovementioned structural changes could typically affect the import coefficients over a period of time. Macroeconomic adjustments are likely to have quicker effects, although they may be one-shot in nature. An important effect discussed in this paper is an exchange rate depreciation in real terms, which can lower import demand, depending on the degree of currency overvaluation. For the eight countries, the median effect of a 10 percent real depreciation is to lower import demand by about 10 percent. The scope for this effect depends both on the degree of currency overvaluation (high in Tanzania, in contrast to Zambia), and complementary macroeconomic policies to achieve a real depreciation. Trade liberalization should be expected to raise the import share in GDP, especially as import restrictions are lifted, and imports needed in export production are made more readily available.

61. Reducing absorption has a significant quantitative effect on reducing import-GDP ratios, according to our estimates. The scope for reduction in the absorption-GDP ratios, however, is mixed, as noted earlier. Changing the composition of absorption may be a more potent and more feasible in reducing the pressure on imports. The paper provided estimates on the effect of reducing government consumption and reducing imports, which should be viewed more as illustrative than precise quantitative effects. GIven the suggested

Table 12: SUMMARY OF LIKELY EFFECTS ON THE IMPORT-GDP RELATION

	Selected Areas	Type of Change	Expected Effect a/ on Import-GDP	Additional Factors	Further Effect on Import-GDP	Country Typology
1.	Overall Growth	Acceleration	Positive	a. Recent dip in imports	More positive	To be Developed by Country Economists
				b. FE constraint	Less positive	
2.	Agriculture	Increase in relative share	Negative	a. Reduced subsistence production	Less negative	
				b. Major reversal of past disincentives	More negative	
3.	Industry	Increase in relative share	Positive	a. Restructuring	Less positive	
				b. Rehabilitation	More positive	
				c. Less protection	Less import-dependent	
4.	Exchange Rate	Devaluation	Negative	Large Overvaluation	More negative	
5.	Import Regime	Mild liberalization	Positive	a. Tariffs in place of QRs	No effect	
				b. Pent up demand	More positive	
6.	Export Policy	Reduce anti-export bias	Positive	Non-traditional exports	More positive	
7.	Factor Markets	Reform	Negative	a. Labor market reform	Lower cap-labor	
				b. Interest reform	Lower cap-labor	
8.	Absorption	Reduction	Negative	Less capital-intensive expenditure	More negative	
9.	Public Investment	Reorientation	Negative	a. Restructuring	More negative	
				b. Rebuilding	Less negative	
10.	Overall Effect	To be developed for individual and group cases.				

a/ The expected effect is based on estimations and impressions for the eight African countries.

direction of a relatively high import intensity of government consumption, country analysis of public expenditure programs would be worthwhile. Factor market reforms are also hypothesized to reduce import-GDP coefficients, although no quantitative analysis was possible in this paper. The overall effect of the abovementioned factors should be aggregated to assess how much of a departure from long-term trends of import elasticities of greater than one might be expected on account of structural and policy changes.

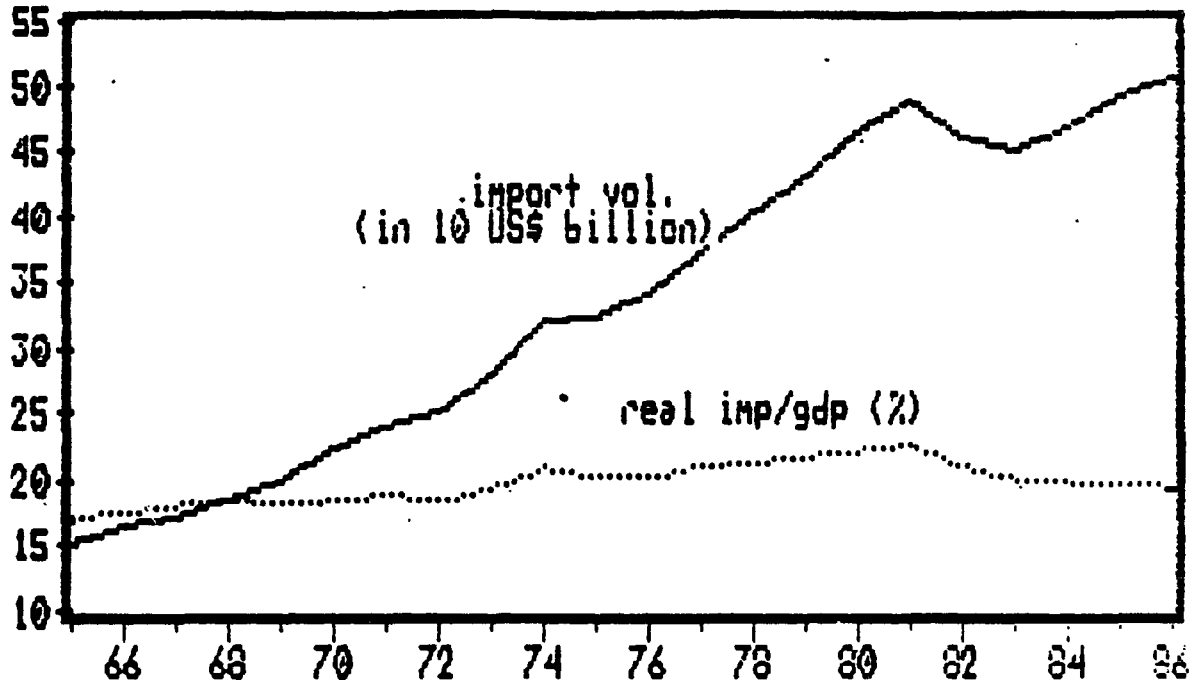
62. As noted at the outset, however, the discussion has not covered some potentially important areas. First, how much of the import-GDP picture in Africa is adequately captured by the variables considered thus far and by available data? We are examining the effects of population, urbanization and foreign aid. in addition to the structural and policy variables employed in this paper. Second, data problems deserve special attention. Smuggling and border trade are particularly important for import estimates, and informal sector and subsistence agriculture activities for output measures. One might also seek to throw light on how the reporting of imports depends on economic management: overvaluation of the currency, transport availability, recording capacity; as well as political factors. Overvaluation of the local currency and devaluation also present biases in the level and changes in the imports-GDP ratio, although the national accounts data used here may have minimized this problem. Third, the import requirements of growth merit much greater disaggregation in the Africa context. For instance, at least food and non-food elasticities should be separated in the analysis. While some of this can be done through the data being compiled by the IEC department, much greater country/content in the discussion of growth bottlenecks relating to imports would be useful.

63. Fourth, at a more general level, the interrelations among exports, foreign aid, foreign exchange constraints and import restrictions is crucial. Recent work has begun to examine the important role of foreign exchange availability and QRs in import-GDP determination, and this line of work deserves to be pursued further. More empirical work on the effect of import policy on the export response would also be valuable. Fifth, the relationship among trade reforms, parallel markets, import intensity and income distribution are important. With LSMS data coming on stream in several African countries, these aspects deserve special attention given the emphasis on trade reform and the significant size of parallel markets in several countries. Finally, a special effort to relate public investment programs to imports would be worthwhile. High elasticities in some periods can be related to particular projects. Changing sectoral emphasis in proposed investment programs can be an important source of information on increases or decreases in import demand in the future.

Annex

Figure 1:

IMPORT VOLUME AND REAL IMPORT SHARE IN DEVELOPING COUNTRIES
(includes goods & non-factor services)

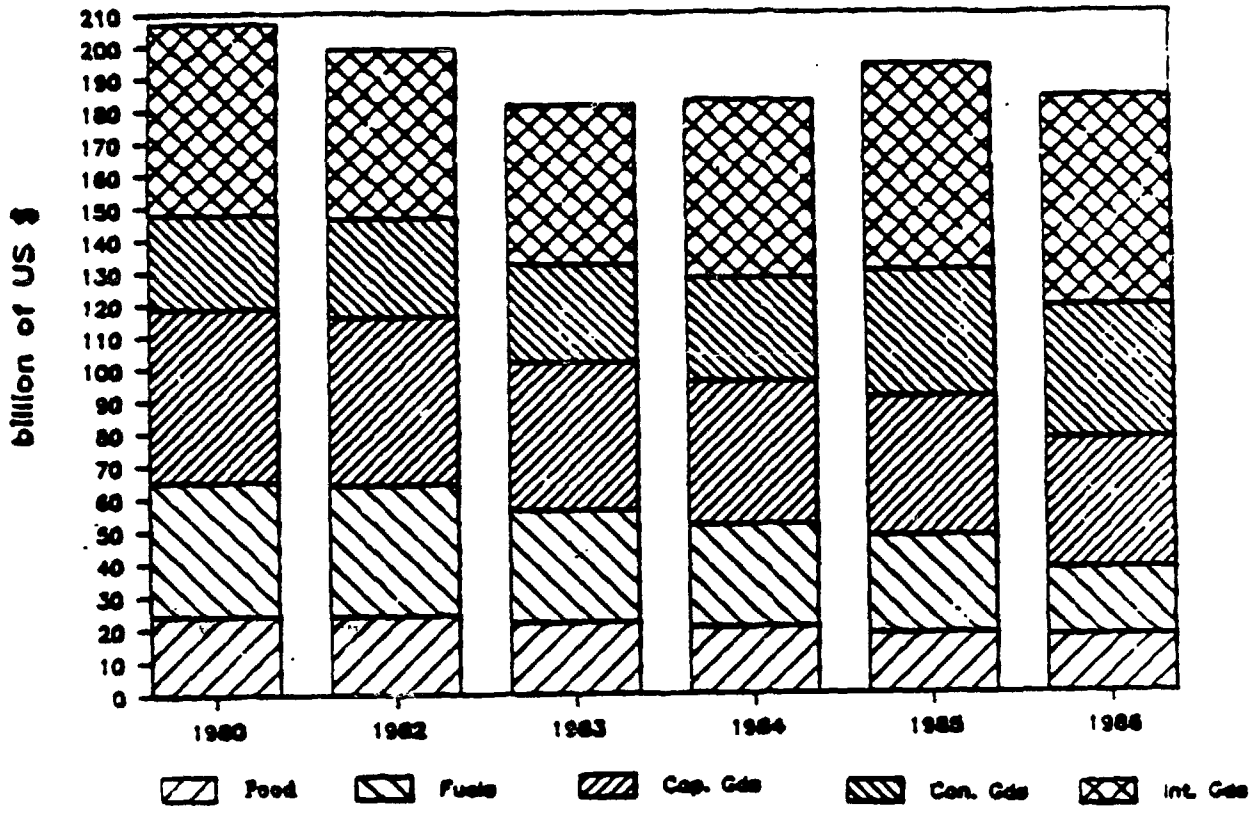


Source: BESD, IBRD.

ANNEX

Figure 2:

COMPOSITION OF IMPORTS IN DEVELOPING COUNTRIES[a]



/a for 87 countries

Source: Region's estimates, World Bank data.

Table 1: GDP GROWTH AND IMPORT GROWTH

	1965-73			1974-81			1982-86			1965-81			1965-86		
	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP	GDP	Import	Imp/GDP
LDC	6.3	7.0	1.1	4.5	7.0	1.6	2.9	-1.4	-0.5	5.4	7.0	1.3	4.8	4.9	1.0
Africa	5.2	6.5	1.3	2.8	6.6	2.4	0.7	-6.4	-9.1	4.0	6.5	1.6	3.2	3.3	1.0
Africa (excl Nigeria)	4.5	5.2	1.2	3.2	3.6	1.1	2.2	-0.8	-0.4	3.8	4.3	1.1	3.5	3.0	0.9
Asia	5.8	8.3	1.4	5.7	9.0	1.6	6.7	5.6	0.8	5.8	8.7	1.5	6.0	7.9	1.3
Europe	6.2	4.9	0.8	3.9	-0.6	-0.2	2.7	1.8	0.7	5.0	2.0	0.4	4.5	1.9	0.4
Middle East	9.3	10.5	1.1	3.6	14.5	4.0	0.1	-7.3	-73.0	6.5	12.6	1.9	5.0	7.7	1.5
Latin America	6.2	6.8	1.1	4.7	6.4	1.4	1.5	-7.4	-4.9	5.4	6.6	1.2	4.5	3.1	0.7
Sub-Saharan Africa	5.6	5.7	1.0	1.6	7.7	4.8	-0.2	-7.1	35.5	3.6	6.8	1.9	2.7	3.3	1.2
SSA (excl Nigeria)	4.4	4.9	1.1	2.6	2.6	1.0	1.9	-1.5	-0.8	3.5	3.6	1.0	3.1	2.4	0.8
Low Income Cos	5.1	3.7	0.7	4.8	6.1	1.3	7.2	7.7	1.1	5.0	4.9	1.0	5.5	5.6	1.0
High Indebted Cos	6.3	7.1	1.1	4.4	8.1	1.8	1.1	-9.1	-8.3	5.4	7.6	1.4	4.3	3.4	0.8
35 SAL Cos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15 Major SAL Cos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 African Cos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Memo Item:															
Cote d' Ivoire	5.6	-	-	5.3	2.7	0.5	-0.6	-2.3	3.8	5.5	-	-	4.1	-	-
Ghana	4.0	-	-	-1.1	6.2	-5.6	1.5	1.9	1.3	1.6	-	-	1.6	-	-
Kenya	6.9	-	-	4.7	-1.9	-0.4	3.0	-1.7	-0.6	5.9	-	-	5.2	-	-
Madagascar	2.1	-	-	0.0	-	-	0.8	-6.0	-7.5	1.1	-	-	1.0	-	-
Nigeria	7.7	-	-	0.1	-	-	-3.2	-19.5	6.1	4.1	-	-	2.5	-	-
Tanzania	5.5	-	-	4.6	-0.2	-0.0	1.4	-1.5	-1.1	5.1	-	-	4.2	-	-
Zaire	6.1	-	-	-0.8	-8.5	10.6	1.2	-3.2	-2.7	2.9	-	-	2.5	-	-
Zambia	7.3	-	-	1.4	-3.1	-2.2	-0.6	-11.0	18.3	4.5	-	-	3.4	-	-

Source: World Economic Outlook, IMF.

ANNEX

Table 2: IMPORT SHARES OF GDP (INCLUDE GOODS AND NON-FACTOR SERVICES)
(in %)

	1965-73	1974-81	1982-86	1965-81	1965-86
LDC 1/	14.4	20.1	21.1	17.1	18.0
Africa 6/	22.9	26.9	23.7	24.8	24.6
Africa (excl. Nigeria) 6/	24.0	28.2	27.2	26.0	26.2
Asia	13.1	21.5	26.5	17.1	19.2
EMENA	22.0	29.7	31.1	25.6	26.9
Latin America	12.1	15.0	13.1	13.5	13.4
Sub-Saharan Africa	22.5	26.7	23.0	24.5	24.1
Sub-Saharan Africa (excl. Nigeria)	24.2	28.7	28.8	26.4	26.9
Low Income Countries 2/	7.5	10.8	13.0	9.0	9.9
High Indebted Countries 3/	12.8	16.6	14.2	14.6	14.5
35 SAL Countries 4/	13.8	18.1	18.2	15.9	16.4
15 Major SAL Countries 5/	15.0	20.3	22.0	17.5	18.5
8 African Countries 6/	21.8	25.6	19.1	23.6	22.6
Memo item:					
Côte d'Ivoire	29.2	38.3	34.6	33.4	33.7
Ghana 6/	20.2	12.9	7.9	16.8	15.1
Kenya	30.2	35.6	27.9	32.7	31.6
Madagascar	23.4	25.7	19.9	24.5	23.5
Nigeria	17.4	23.8	15.9	20.4	19.4
Tanzania	27.7	27.4	16.6	27.6	25.1
Zaire	16.5	20.0	31.2	18.2	21.1
Zambia	38.3	42.1	36.8	40.1	39.4

Definition

1. Based on WDR 90 countries.
2. Based on WDR 30 low income countries
3. Based on WDR 17 high debt countries
4. Based on the World Bank's structural adjustment lending countries.
5. Chile, Colombia, Côte d'Ivoire, Jamaica, Kenya, Korea, Malawi, Mauritius, Mexico, Morocco, Panama, Philippines, Senegal, Thailand, and Turkey.
6. Data is up to 1985 only.

Source: BESD

ANNEX

Table 3: IMPLICIT EXPORT TAXES FOR SELECTED AGRICULTURAL COMMODITIES a/

	Tobacco			Cocoa			Coffee			Tea		
	1983	1984	1985	1983	1984	1985	1983	1984	1985	1983	1984	1985
Zambia	27.3	-	-	-	-	-	-	-	-	-	-	-
Tanzania	53.1	52.5	37.1	-	-	-	23.1	31.3	27.5	-	-	-
Nigeria	-	-	-	4.2	14.9	16.4	-	-	-	-	-	-
Kenya	-	-	-	-	-	-	-7.02	2.7	8.00	-69.4	-22.4	-
C te d'Ivoire	81.3	82.6	82.9	56.2	61.0	56.2	68.8	69.7	67.9	-	-	-
Ghana	-	-	-	-187.0	64.4	52.5	-	-	-	-	-	-

a/ Defined as:

$$tx = \left[1 - \frac{px}{E\ px^*} \right] . 100$$

This assumes away binding export quotas. If there were indeed binding export quotas, then our calculations would capture the price differential arising from the export tax proper plus the price differential resulting from export quotas.

where

tx : Implicit export tax rate.

px : Domestic prices. These were proxied by official producers' prices (World Bank), adjusted for transportation and other costs by using the IFS CIF/FOB conversion factors.

px^* : World prices for the ith commodity. These were proxied by IFS London or New York commodity prices.

E : Dollar prices were converted to home currency units by using the IFS nominal official exchange rate (line rf). Converting dollar prices to local currency by means of "black market" exchange rate would substantially increase our estimates of implicit export taxes.

ANNEX

Table 4: ABSORPTION TO GDP RATIOS IN AFRICAN COUNTRIES (1970-85)

	Côte d'Ivoire	Ghana	Kenya	Madagascar	Nigeria	Tanzania	Zaire	Zambia
1970	93.3	101.4	100.8	101.1	100.2	102.0	91.9	83.2
1971	96.2	104.5	106.5	106.1	99.3	104.7	97.0	102.1
1972	95.5	94.5	102.1	103.3	97.1	103.6	98.8	98.4
1973	97.5	94.9	101.3	104.0	94.1	106.1	95.5	84.2
1974	92.7	103.5	107.2	103.9	81.1	114.6	94.6	90.5
1975	99.9	99.1	104.7	104.3	112.4	109.8	102.0	119.5
1976	94.5	100.3	99.3	101.4	99.3	102.2	100.9	94.9
1977	93.7	101.1	96.6	102.6	100.6	103.3	105.6	102.6
1978	100.9	101.3	109.8	106.2	104.1	115.1	99.2	103.4
1979	103.1	99.9	106.0	116.3	93.7	112.7	98.7	91.0
1980	106.2	100.7	111.4	117.1	93.5	113.2	101.2	104.0
1981	107.2	100.6	109.0	111.6	106.6	108.5	105.6	112.5
1982	102.9	99.6	104.6	109.5	107.2	110.5	104.2	108.8
1983	98.8	103.2	101.1	106.8	103.7	108.1	102.2	101.1
1984	88.9	100.3	102.4	104.4	98.2	108.9	97.4	96.2
1985	86.8	101.8	102.4	105.3	92.2	110.0	97.7	97.7

Source: BESD System, World Bank.

ANNEX

Table 5: REAL EFFECTIVE EXCHANGE RATE INDICES, 1980=100
(TRADE WEIGHT AT 1980)

	Côte d'Ivoire	Ghana	Kenya	Madagascar	Nigeria	Tanzania	Zaire	Zambia
1965	150.01	254.24		98.15			201.02	
1966	146.27	232.68		97.72			176.66	
1967	142.39	295.37		96.62			202.82	
1968	134.35	327.22		95.24	224.61	115.34	252.44	64.31
1969	139.52	316.36		100.08	210.52	102.10	245.95	64.72
1970	141.09	327.92		107.08	194.87	105.27	241.19	66.20
1971	145.25	318.31		105.46	171.77	104.86	235.69	67.33
1972	148.74	408.91		102.59	169.22	107.84	229.39	70.39
1973	145.82	357.98		106.85	191.04	113.49	248.75	73.61
1974	159.97	354.22	100.64	113.11	191.94	114.82	185.09	91.90
1975	142.57	322.65	96.24	101.07	158.66	105.89	155.04	91.09
1976	140.58	211.86	99.49	106.74	133.97	112.42	131.54	84.69
1977	121.87	109.18	94.50	113.77	123.44	111.06	97.23	86.31
1978	112.70	99.01	86.58	113.04	113.18	107.77	72.14	85.98
1979	106.43	134.14	92.88	108.29	110.24	116.07	80.83	91.75
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	106.73	44.40	104.75	89.81	89.27	75.40	97.07	94.96
1982	114.23	35.05	102.06	82.39	88.22	61.39	91.28	85.65
1983	120.86	19.36	104.89	82.69	74.89	55.48	67.64	92.93
1984	127.85	141.45	98.64	97.98	55.35	53.05	191.25	105.99
1985	129.08	193.81	98.85	103.02	61.20	46.37	208.77	113.44
1986	115.35	287.71	98.50	111.55	100.94	65.12	208.33	220.73

Note: Real effective exchange rate indices are calculated as trade weighted geometric average of the bilateral exchange rates adjusted by the ratio of domestic consumer price index to the corresponding trade partner wholesale price index.

ANNEX

Data Definitions and Sources

Real Merchandise Imports: Nominal dollar merchandise imports deflated by a country-specific dollar import price index (1980=1). Merchandise imports are taken from the ANDREX tapes (IECSE/World Bank), line "CP, IMP, TOTAL". This series follows very closely merchandise imports (SITC's 0-9) as reported by UNCTAD. However, as the latter series covers up to 1983 only, we used the IECSE series instead. The country-specific dollar import price indices are from the ANDREX tapes, line "PT, IMP, TOTAL". These price indices are weighted averages of sub-indices for five import categories: manufactures, food, non-food agriculture, metals and minerals, and fuels. These categories were defined according to one-digit, two-digits and three-digits SITC's codes. For the specifics, see Moran and Park (1986).

Ratio of Intermediate Imports to GDP, at Constant Prices: Intermediate, capital and fuel constant dollar imports relative to constant dollar GDP. Intermediate, capital and fuel current dollar imports are taken from UNCTAD's COMTRADE tapes, accessed through the TARS software (World Bank). These aggregates are made up as follows. Intermediates = SITC's 2 (crude materials, excluding fuels) + 5 (chemicals) + 6 (basic manufactures). Capital goods = SITC 7 (machines and transport equipment). Fuel = SITC 3 (mineral fuels). These import aggregates do not correspond to those available in ANDREX, which follow the categories employed for constructing the import price sub-indices. For this reason, we used UNCTAD's import data instead. Current dollar intermediate imports were converted to constant terms by deflating through the country-specific dollar import price index (1980=1). Although IECSE has produced separate indices for fuel and manufactured imports, we could not construct an index for intermediate imports on the basis of these two, since manufactures includes intermediates proper and capital goods, as well as non-food consumer goods. This last category cannot be disentangled from other manufactures. Hence, since we did not have a specific intermediate import price index at hand, we settled for the overall one. Constant (1980) dollar GDP is taken from ANDREX, line "KP.$.GDP.MP". We should note that this series uses the "atlas" exchange rate to convert local currency GDP data to dollar GDP data. The "atlas" exchange rate proxies for the rate actually applied in transactions and thus seeks to eliminate biases associated with overvaluation. For a description of the methodology employed for computing the "atlas" exchange rate, see the technical notes in a World Development Report.

Real Income: Nominal home-currency GDP deflated by the implicit home-currency GDP deflator (1980=1). Both series are from the BESD tapes, (IECSE/World Bank).

Absorption to GDP: Nominal home-currency absorption relative to nominal home-currency GDP. Absorption is equal to the sum of private consumption, public consumption, and investment, and is taken from BESD.

Real Absorption: Nominal home-currency absorption deflated by the nominal-home currency GDP deflator (1980s).

Real Exchange Rate: Nominal exchange rate index (1980=1) deflated by the implicit GDP deflator (1980=1). The Nominal exchange rate is a bilateral rate which indicates the number of domestic currency units traded per US dollar. It is taken from BESD and is the same as the period-average exchange rate in IFS (line 'rf).

Real Effective Exchange Rate: Nominal effective exchange rate index (1980=1) deflated by the CPI (1980=1). The nominal effective exchange rate indices use 1980 trade weights derived from the Direction of Trade Statistics Yearbook. These indices were calculated by CECTP (World Bank). The CPI's are from BESD (same as line 64 in IFS).

Import Price Index: Country-specific dollar import price (1980=1). See description for real merchandise imports.

Ratio of Exports of Goods and Services to Net Debt: Nominal dollar exports of goods and services relative to nominal dollar net debt. Exports of goods and services are taken from ANDREX, line "CR, EXP, GS". Net debt is defined as the stock of debt exclusive foreign exchange reserves. The stock of debt is taken from BESD, and it refers to long-term public and publicy-guaranteed disbursed outstanding debt. Foreign exchange reserves, including gold holdings, are taken from the IFS tapes (line 1..D).

Real Exports of Goods and Services: Nominal dollar exports of goods and services deflated by a country-specific dollar import price index (1980=1).

Real Net Debt: Nominal dollar net debt deflated by a country-specific dollar import price deflator (1980=1).

Investment Share in GDP: Nominal home-currency investment relative to nominal home-currency GDP. Investment here incorporate fixed investment as well as changes in stocks. Both investment and GDP are from BESD.

Agricultural Share in GDP: Nominal home-currency agricultural GDP relative to nominal home-currency aggregate GDP. This series was converted to a three-year moving average, centered on the middle observation. For Côte d'Ivoire, Kenya, Nigeria and Tanzania, agricultural GDP and aggregate GDP are at factor cost ("basic prices"). Conversely, for Ghana, Madagascar, Zaire and Zambia, agricultural GDP and aggregate GDP are both at market prices ("producer prices"). All of these data are from BESD.

Population: Million inhabitants, taken from BESD. This series was converted also to a three-year moving average, centered on the middle observation.

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